Current Status of the EUVL Development at CEL, LASTI, University of Hyogo

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Center for EUVL, University of Hyogo





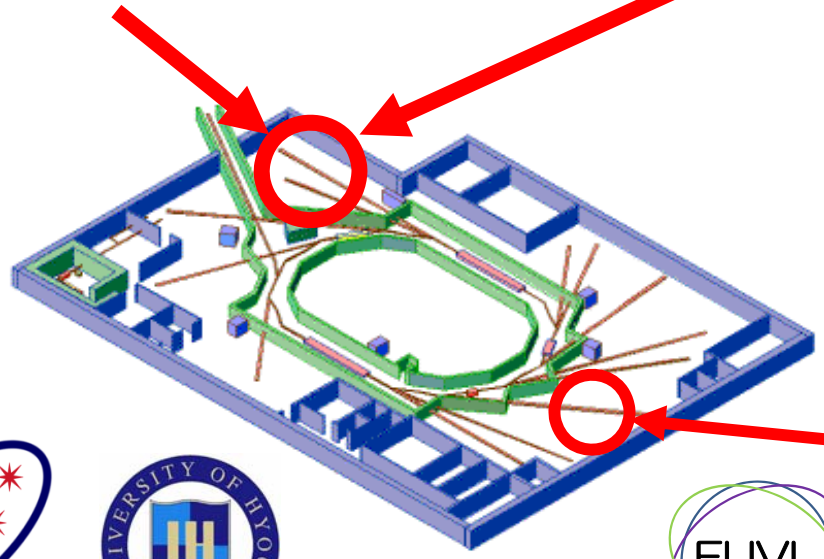
Center for EUVL, *NewSUBARU Synchrotron Radiation Facility*

Reflectometer (BL10)
μCSM (BL10)

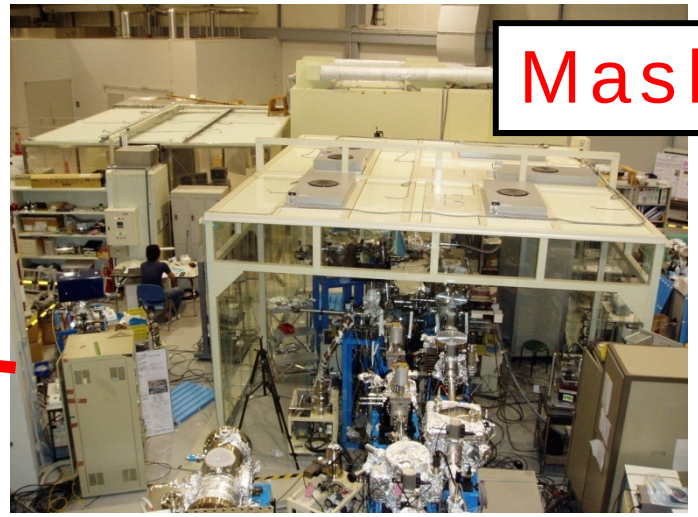


EUV Interference Lithography (BL9B)
Outgas and Contamination (BL9C)





EUVM & CSM （BL3）

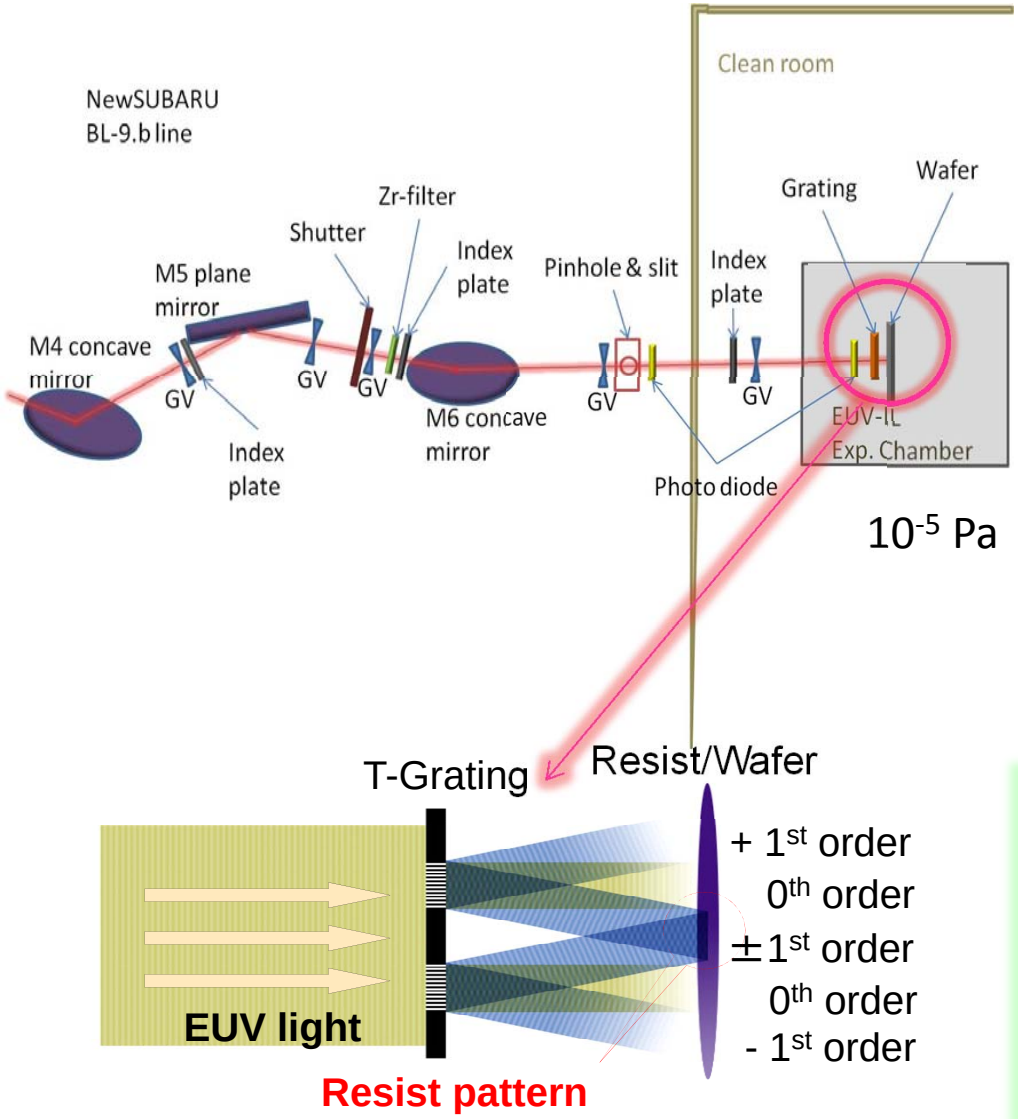


NewSUBARU

UNIVERSITY OF HYOGO

EUVL

EUV Interference Lithography



Exposure tool



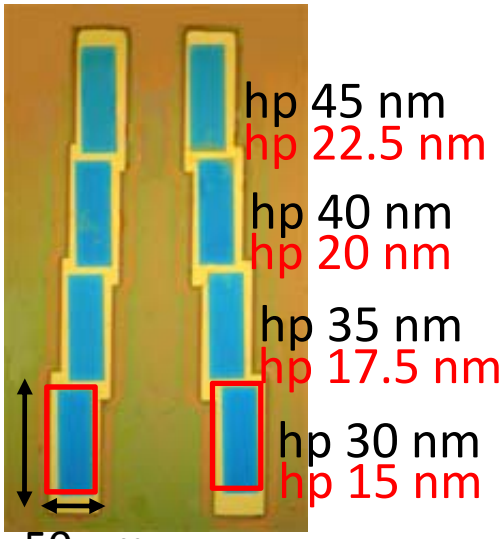
Clean room
Class 100



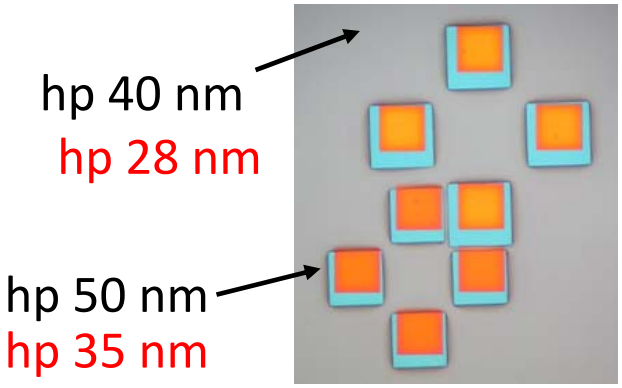
■The Interference fringes were created at the interference point of 1st order and -1st order diffracted lights.

■ Replication pattern pitch of the resist pattern has a half pitch size of the diffraction grating.

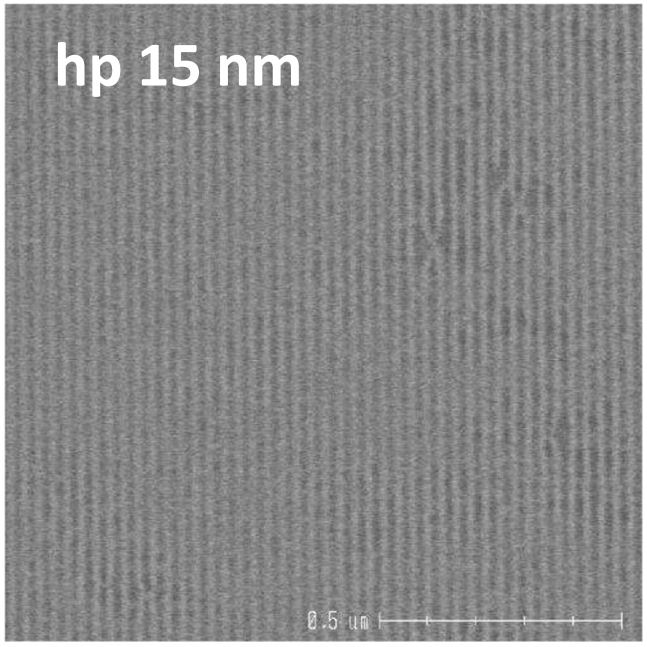
Resist replication results

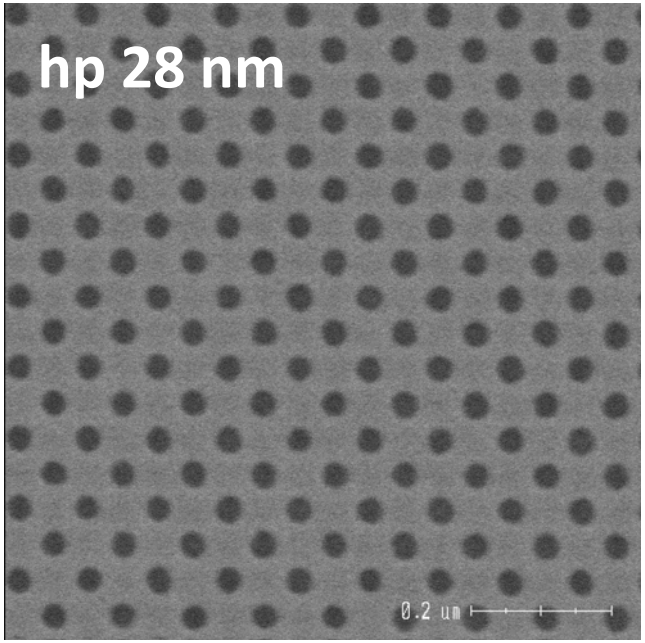


Two window transmission grating

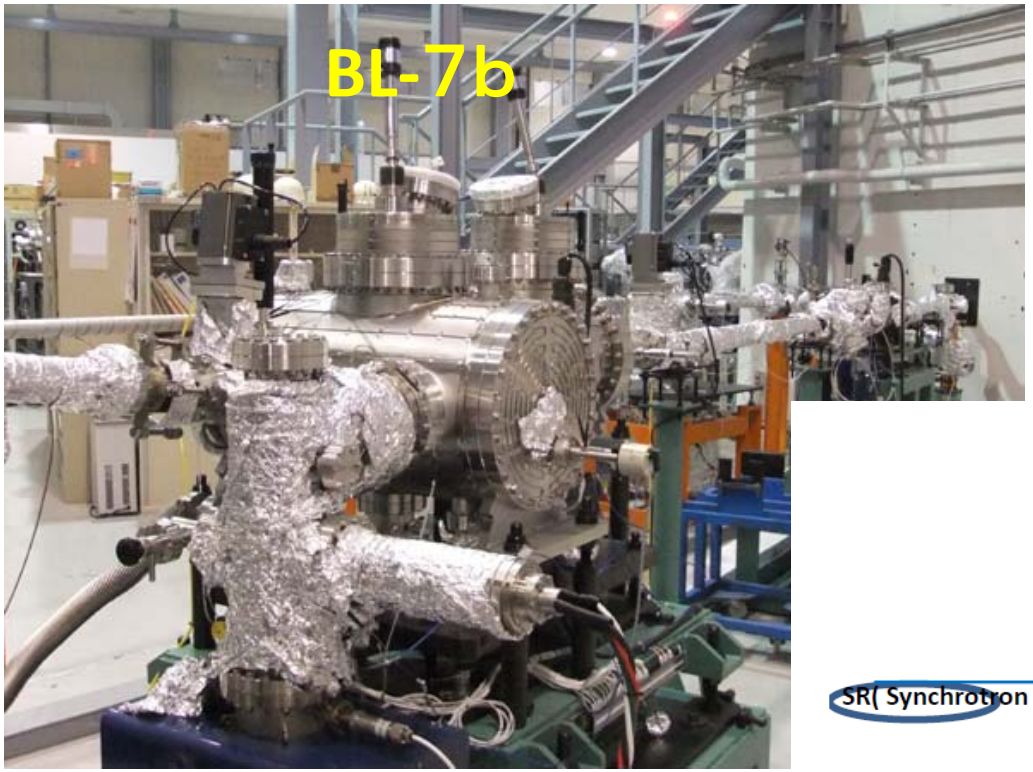


Four window transmission grating

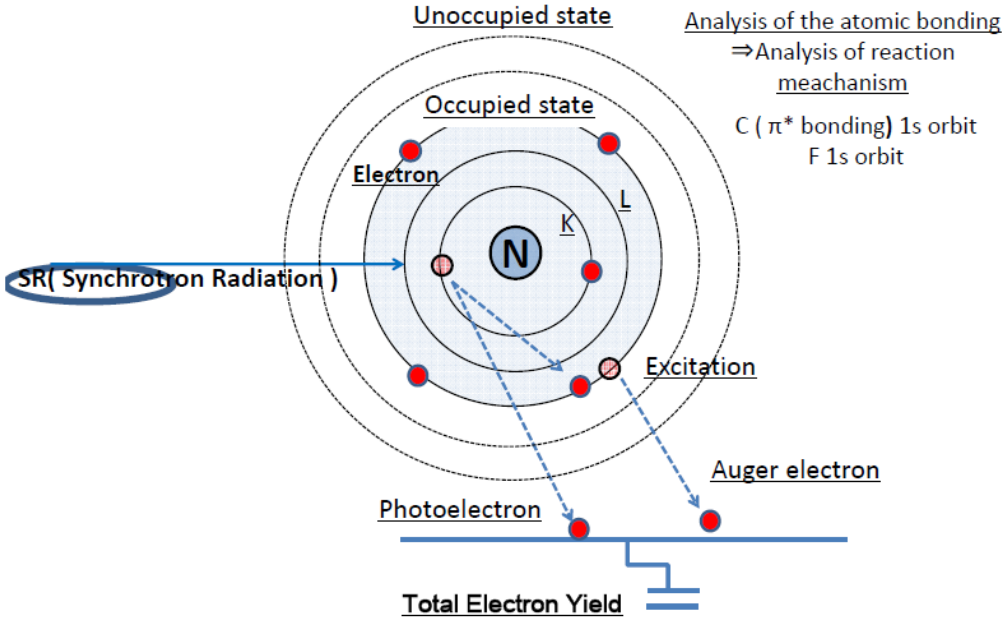




Resist chemical reaction study by SR absorption spectroscopy for high sensitivity and low LWR



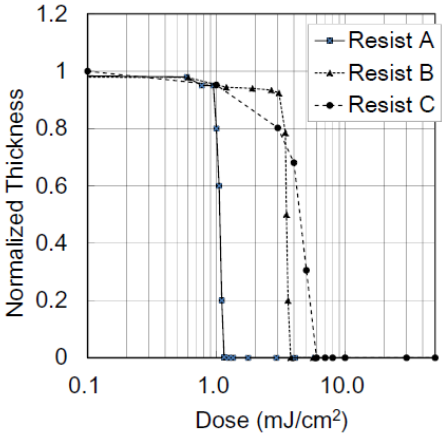
World first analysis for chemical reaction of EUV resist!!



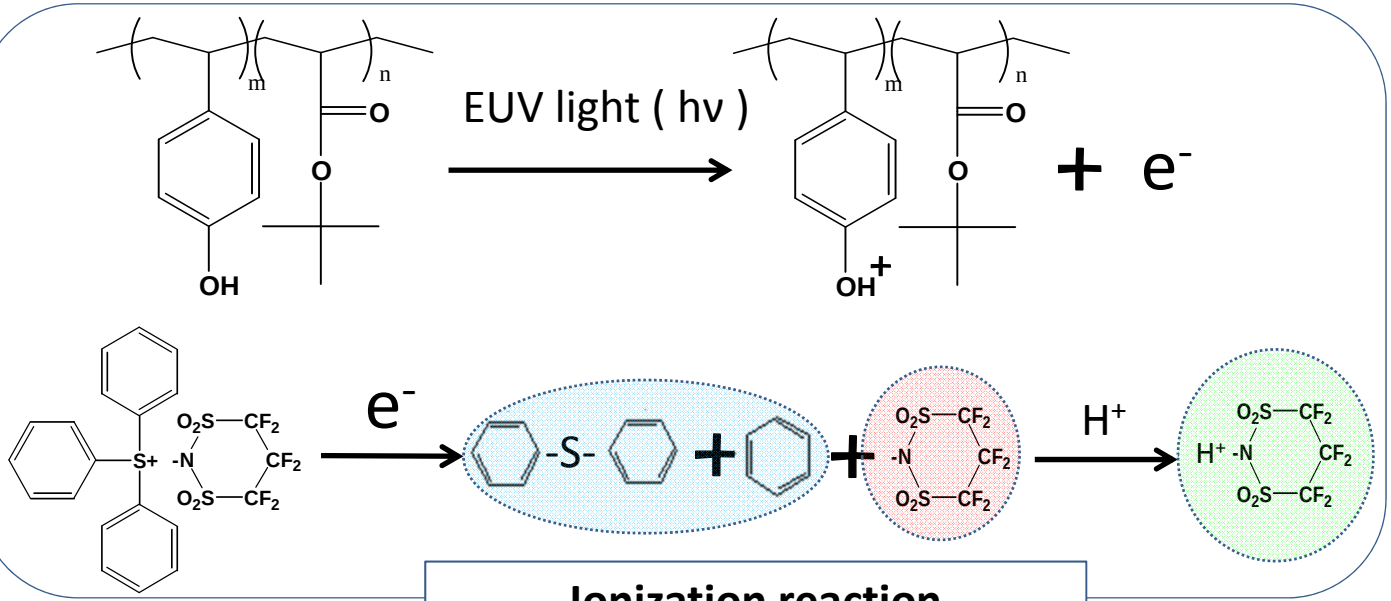
Energy Resolution
E/ΔE=～3000

Resist chemical reaction study by SR absorption spectroscopy for high sensitivity and low LWR

Why 4 times high sensitive in Imidate type of PAG under EUV exposure??



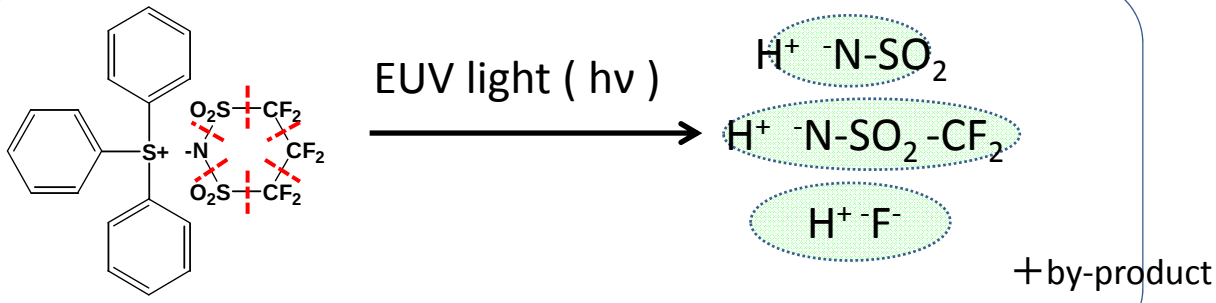
Conventional reaction



Ionization reaction

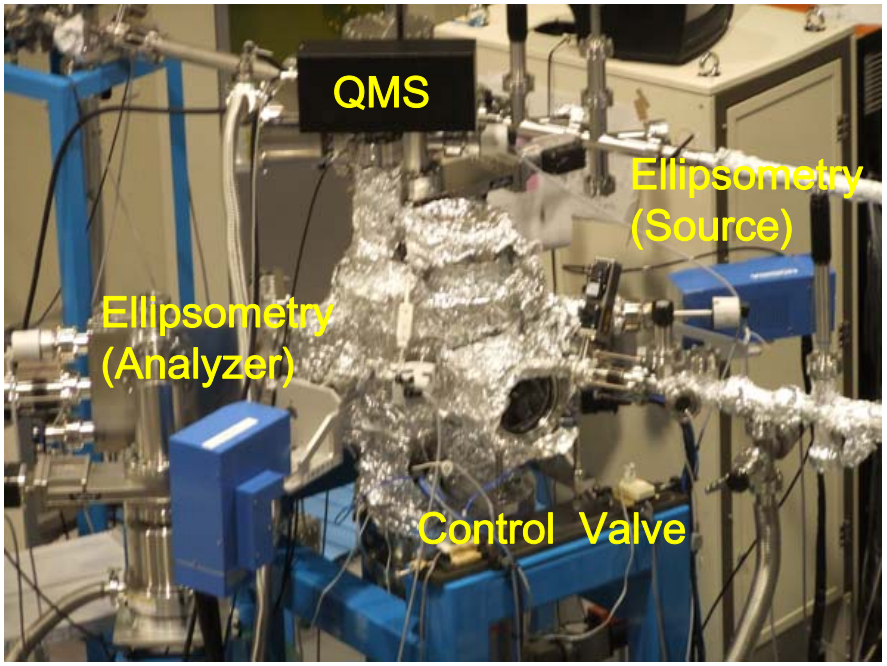
+

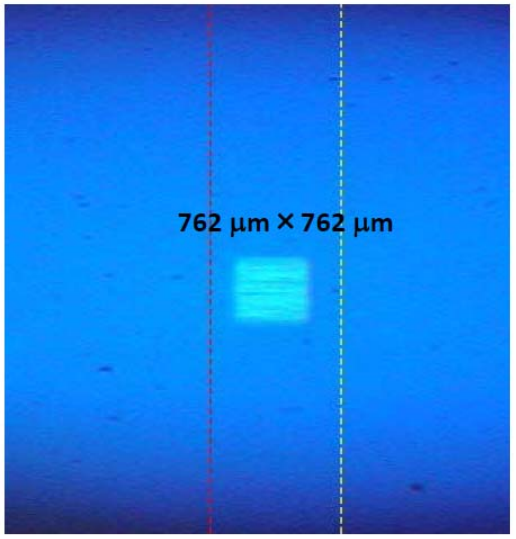
Additional reaction



Direct excitation reaction

Contamination evaluation tool using in-situ ellipsometry adapted to the 10.8-m-long undulator

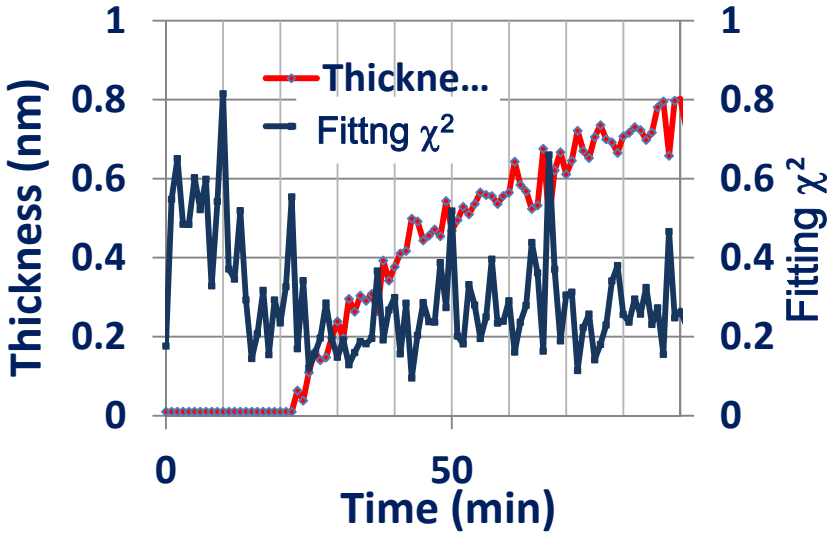


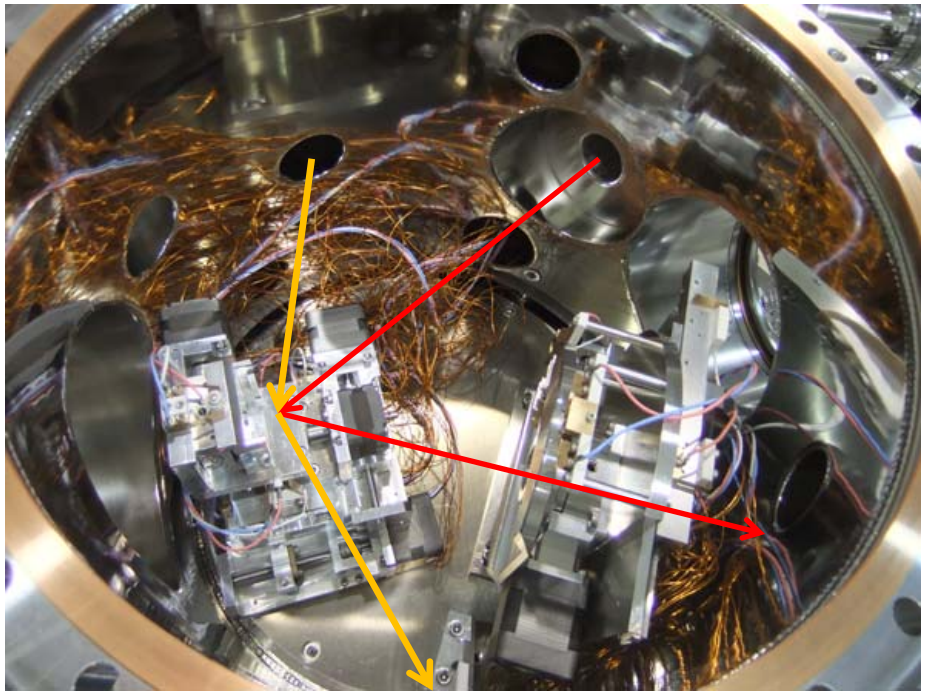


Phase-modulation -type spectroscopic ellipsometer
λ 450 nm ~ 1000 nm

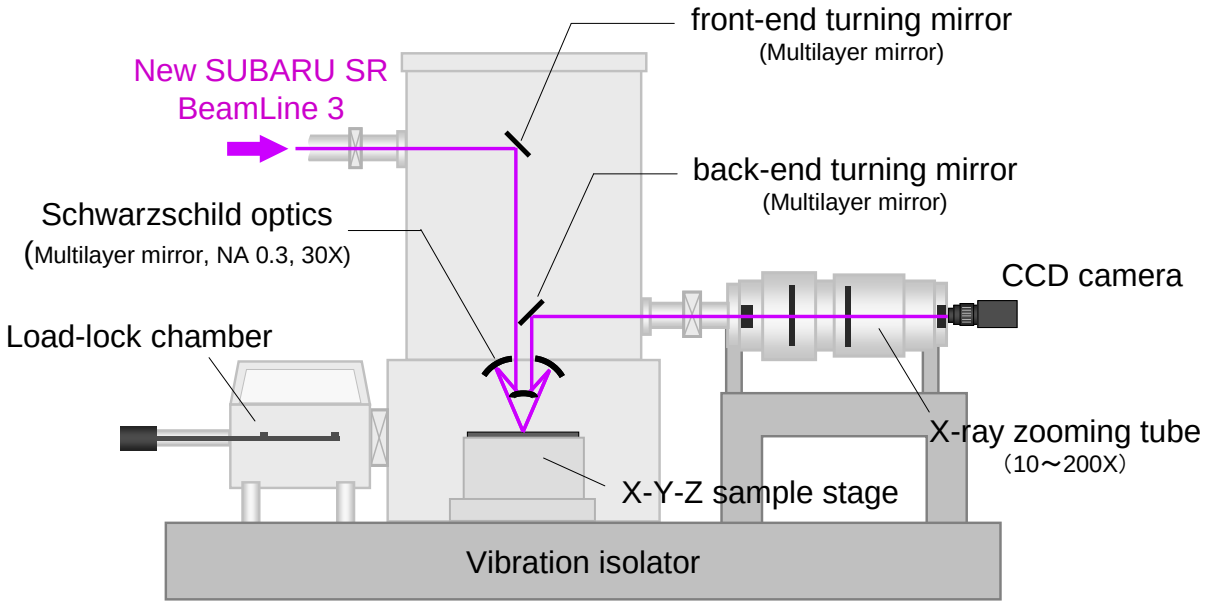
On a witness sample
320 mW/cm^2
in-band EUV

On a resist sample
149 mW/cm^2





EUV Microscope (EUVM) for EUV mask inspection



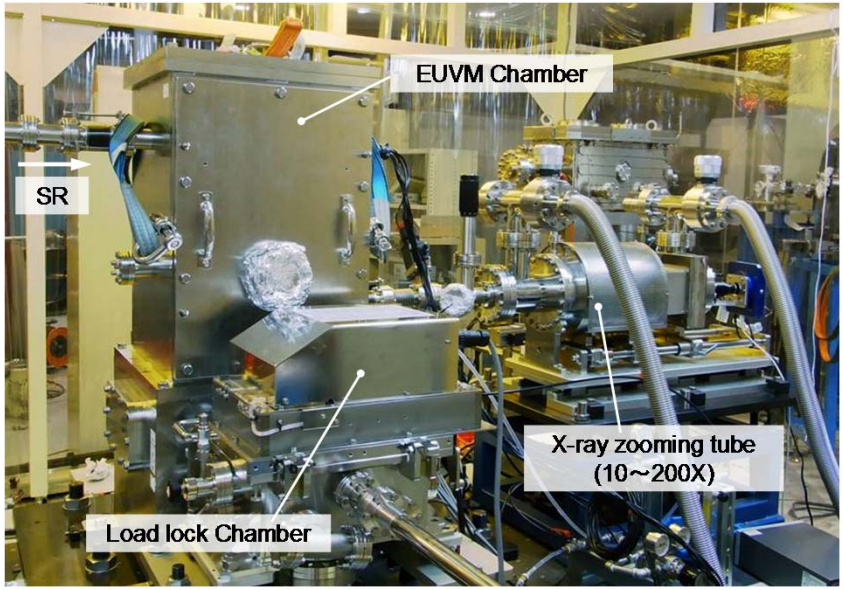
Source： Bending magnet
Inspection: Bright field
Time： 10～20 s
Mag.： 300～6000 X
NA：0.3

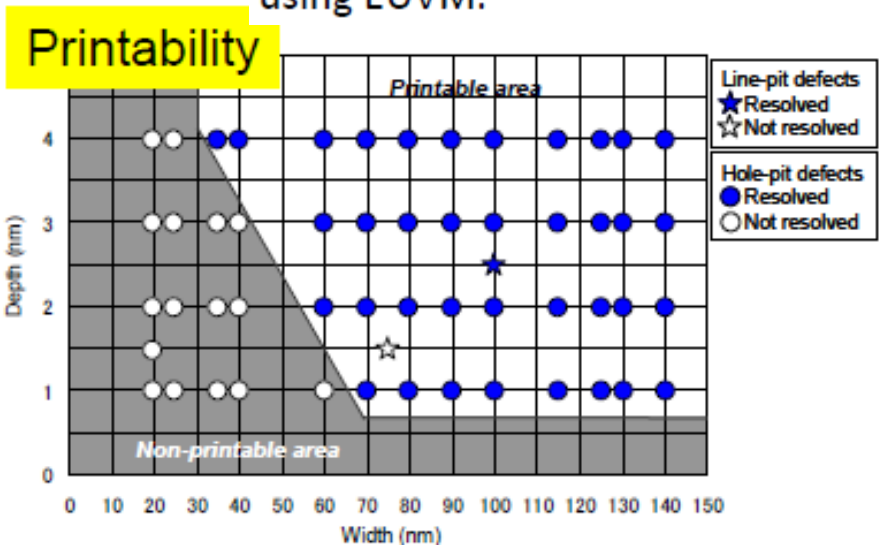
Controlled the width and height of the programmed defect.

Depth: 1～4 nm

Width: 20～140 nm

The printability criteria was clarified using EUVM.





Thank you for your attention !!